

REMARKS

This paper responds to the Office Action mailed on June 1, 2007.

Claims 2-4, 8-21, 40 and 46 are amended, claims 22-39 are canceled, and no claims are added; as a result, claims 1-6, 8- 21 and 40-50 are now pending in this application.

§112 Rejection of the Claims

Claims 2 and 8-21 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the term “a polysilicon sacrificial second film” was stated to render the metes and bounds of the claims unclear as not being clear whether it is the same film as the second dielectric layer. Applicant respectfully submits that the term “a polysilicon sacrificial second film” was in the claims as originally filed, and refers to a thin conductive film of either doped or undoped polysilicon, as discussed in the specification at least at page 10, lines 17-23 and 31. Applicant has amended the claims to address the rejection by making it clearer what the sacrificial film limitation entail, and requests that this rejection be withdrawn in view of the claim amendments.

§102 Rejection of the Claims

Claims 46-50 were rejected under 35 U.S.C. § 102(b) for anticipation by Lee et al. (KR Publication 2001-037699). Applicant respectfully traverses this rejection.

Lee discloses increasing capacitance without increasing aspect ratio (abstract) with four oxide and two nitride layers. The present application discloses two oxide layers. Lee exposes storage node contact 100, deposits polysilicon on the sides of the fourth oxide 120 and fills the holes with a liquid spin on glass 12 (fig. 1C). An etch back separates the polysilicon 130 inside the storage node contact holes into separate capacitor plates, which are in contact with the fourth oxide 120 (10 in figs. 1 and 2).

Applicant respectfully submits that Lee's structure does not extend from the substrate, but rather is always surrounded by and in contact with the fourth oxide layer (10 in figure 1 or 120 in figure 2) as admitted by the Examiner in prior Office Actions. Thus, the resulting structure of Lee is different from the claimed invention.

Specifically, Applicant respectfully submits that the cited reference does not disclose at least the feature of “...*wherein the conductive structure is formed to extend above a remaining portion of the first dielectric stack to form an exposed vertical portion not in contact with dielectric ...*”, as recited in independent claim 46, as amended herein, from which claims 47-50 directly depend. Lee forms the conductive structure 130 on the inside walls of the fourth oxide 120, and does not remove the fourth oxide, nor does any portion of the conductive structure extend above the fourth oxide 120. The present arrangement has the conductive structure 132 or 352 extending above at least the first dielectric layer 138 or 339 (figs. 1F, 1G, 3F and 3G). Thus the process is different at least in extending above a remaining portion of the first dielectric stack, in having a different etch order, and in having sidewall recited to be vertical.

In view of the above noted differences in the claimed method, Applicant submits that the cited reference does not disclose each and every claimed feature, and thus the independent claim, as amended herein, are patentably distinct over the reference. The dependent claims are held to be patentably distinct over the cited reference at least as depending from base claims shown above to be patentable. Applicant respectfully requests this rejection be reconsidered and withdrawn.

§103 Rejection of the Claims

Claims 4-5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lee et al. (KR Publication 2001-037699) in view of Choi (U.S. 6,080,594) and O'Brien (U.S. 5,817,182). Applicant respectfully traverses this rejection.

The cited reference of Lee is discussed above with reference to the prior rejection, and is submitted to differ at least by having the capacitor plates still in contact with the fourth oxide 120 (See figures 1 and 2).

Choi is used in the outstanding Office Action to show that it is known to eliminate spin-on-glass by wet etching first. Applicant submits that since Lee teaches the importance of using a dry etch first, then the two references are in conflict and could provide no possible motivation to make the suggested combination.

O'Brien is used in the outstanding Office Action to show that it is known to remove etch residues, and that it is useful to rinse after etching in order to remove etchant residues that may impact subsequent processing, device yield or reliability.

Applicant submits that neither Choi nor O'Brien cure the failure of Lee to teach or suggest exposed vertical walls, or removing the fourth oxide from the outside of the non-vertical walls of the conductive structure, or to have a two layer dielectric stack that is etched. Applicant further submits that since claim 5 depends directly from allowed claim 1, and claim 4 as amended herein also depends from allowed claim 1, that the dependent claims are believed to be in patentable condition at least as depending from a patentable base claim as shown above, since any claim depending from a nonobvious independent claim is also nonobvious. See M.P.E.P. § 2143.03.

Applicant respectfully requests this rejection under 35 U.S.C. § 103(a) be reconsidered and withdrawn in view of above discussion of the relationship between the claims in question and allowed claim 1. Applicant notes that claims 2-6 and 8 all depend from allowed claim 1, and request that these claims be allowed.

Claims 6 and 8-21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lee et al. in view of Choi, O'Brien and Kang et al. (U.S. Publication 2004/0175884). Applicant respectfully traverses this rejection, and notes that claims 6 and 8 depend from allowed claim 1.

Lee, Choi and O'Brien have features discussed above. The Kang reference discloses capacitors with a larger diameter at the bottom than at the middle of the capacitor, since Kang's figures show that the side walls 280 of the capacitor are outwardly sloping. Applicant submits that Kang's sidewalls are not vertical as recited in the present claims.

Applicant submits that no combination of the cited references cure the failure of Lee to teach or suggest either capacitor walls extending above the surrounding dielectric support, specifically the fourth oxide layer, and thus the combination of Kang with the other cited references would not result in the present method and arrangement.

Applicant respectfully submits that the suggested combination of references fails to describe or suggest at least the features of "...second etching to expose a second portion of the conductive structure and exposing at least a portion of the substrate ...", as recited in

independent claim 9, from which claims 10-21 depend. The suggested combination of references, whether taken alone or in any combination, does not suggest a method having the conductive structure exposed and separated from the support of the surrounding dielectric.

Applicant submits that independent claim 9 has been shown to have recited features not described or suggested by the combination of cited references, and is thus in patentable condition. The dependent claims are held to be patentable at least as depending from a patentable base claim, as shown above, since any claim depending from a nonobvious independent claim is also nonobvious. See M.P.E.P. § 2143.03. In view of the failure of the suggested combination of references to describe or suggest an etch process resulting in more vertical sidewalls and having conductive structures extending beyond the dielectric layer, Applicant respectfully requests this rejection under 35 U.S.C. § 103(a) be reconsidered and withdrawn.

Claims 40-45 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lee et al. in view of Jost et al. (U.S. 5,966,611) and Sell (U.S. Publication 2004/0147074). Applicant respectfully traverses this rejection.

Lee is discussed above and teaches capacitor plates in contact with the fourth oxide 120. Jost is used in the outstanding Office Action to show that organic sacrificial layers are known. Sell is used in the outstanding Office Action to show that trench capacitors are known to have aspect ratios. Applicant submits that Jost and Sell do not suggest exposed vertical walls.

Applicant respectfully submits that the suggested combination of references fails to describe or suggest at least the features of “...wherein the conductive structure includes at least an exposed vertical portion and portion of the substrate active area ...”, as recited in independent claim 40, as amended herein, from which claims 41-45 depend. No combination of cited references suggest the container capacitor conductive structure 132 of figure 1F being exposed. Jost discloses removing a covering layer and not a layer having an embedded conductive structure as recited (col. 3, line 45).

Applicant submits that the independent claims have recited features not described or suggested by the combination of cited references, and are thus in patentable condition. The dependent claims are held to be patentable at least as depending from a patentable base claim, as shown above, since any claim depending from a nonobvious independent claim is also

nonobvious. See M.P.E.P. § 2143.03. In view of the failure of the suggested combination of references to describe or suggest an etch process resulting in more vertical sidewalls and having conductive structures extending beyond the dielectric layer, Applicant respectfully requests this rejection under 35 U.S.C. § 103(a) be reconsidered and withdrawn.

Claims 22-39 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Chan et al. (U.S. 6,764,947) in view of O'Brien. Applicant respectfully submits that claims 22-39 are cancelled herein without prejudice or waiver of patentable subject matter contained therein. Applicant respectfully requests this rejection under 35 U.S.C. § 103(a) be withdrawn.

RESERVATION OF RIGHTS

In the interest of clarity and brevity, Applicant may not have addressed every assertion made in the Office Action. Applicant's silence regarding any such assertion does not constitute any admission or acquiescence. Applicant reserves all rights not exercised in connection with this response, such as the right to challenge or rebut any tacit or explicit characterization of any reference or of any of the present claims, the right to challenge or rebut any asserted factual or legal basis of any of the rejections, the right to swear behind any cited reference such as provided under 37 C.F.R. § 1.131 or otherwise, or the right to assert co-ownership of any cited reference. Applicant does not admit that any of the cited references or any other references of record are relevant to the present claims, or that they constitute prior art. To the extent that any rejection or assertion is based upon the Examiner's personal knowledge, rather than any objective evidence of record as manifested by a cited prior art reference, Applicant timely objects to such reliance on Official Notice, and reserves all rights to request that the Examiner provide a reference or affidavit in support of such assertion, as required by MPEP § 2144.03. Applicant reserves all rights to pursue any cancelled claims in a subsequent patent application claiming the benefit of priority of the present patent application, and to request joinder of any withdrawn claim, as required by MPEP § 821.04.

CONCLUSION

Applicants respectfully submit that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicants' attorney David Suhl at (508) 865-8211, or the undersigned attorney at (612) 349-9587 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

KEVIN TOREK ET AL.

By their Representatives,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.
P.O. Box 2938
Minneapolis, MN 55402
(612) 349-9587

Date 14 Jan '08

By 

Timothy B. Clise
Reg. No. 40,957

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Amy Moriarty
Name


Signature